

Alaska Fisheries Science Center  
Resource Ecology & Fisheries Management  
7600 Sand Point Way NE, Bldg. 4  
Seattle, WA 98115  
June 2, 2003

**Cruise Report**  
**F/T Seafisher Cruises**  
**SE200201 (23-28 August 2002)**  
**SE200202 (30 September - 12 October 2002)**

**Project Title: Atka mackerel tag recovery Seguam and Tanaga Passes,  
Aleutian Islands Alaska**

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**Scientific Purpose**

The first objective of our tag release-recovery studies is to determine the efficacy of trawl exclusion zones as a management tool to maintain prey abundance/availability for Steller sea lions at local scales. The second objective, implemented in 2002, is to determine the feasibility of a before-after controlled experiment for Atka mackerel-fishery interactions. Trawl exclusion zones were established around sea lion rookeries as a precautionary measure to protect critical sea lion habitat, including local populations of prey such as Atka mackerel. Localized fishing may affect Atka mackerel abundance and distribution near sea lion rookeries. Tagging experiments are being used to estimate abundance and movement between areas open and closed to the Atka mackerel fishery. A feasibility study was conducted in 1999 at Seguam Pass. In summer 2000, approximately 8000 tagged Atka mackerel were released in Seguam Pass, and in 2001 approximately 1000 were released during a truncated cruise. In June-July 2002, ~ 21,000 fish were tagged in the Seguam Pass area, and ~ 14,520 were tagged near Tanaga Pass. Recovery of tagged fish is supplied by the fishery in the open area outside the trawl exclusion zone. Recoveries in the closed area are provided by chartered recovery cruises. Our tagging studies to date have focused on Atka mackerel movement and abundance in the presence of a fishery. To address our second objective, tagged Atka mackerel were recovered during cruises in the Seguam Pass area both before (SE200201) and after (SE200202) the B-season Atka mackerel fishery. Tagged fish were recovered in the Tanaga Pass area only after the fishery (SE200202).

### **Personnel SE200201**

<u>Name</u>	<u>Sex/Natl.</u>	<u>Position</u>	<u>Organization</u>
1. S. McDermott	F/USA	Field Party Chief	AFSC/S
2. S. Neidetcher	F/USA	Watch Leader	AFSC/S
3. K. Rand	F/USA	Fish. Biologist	AFSC/S
4. R. Christiansen	F/USA	Student Intern	AFSC/S

### **Personnel SE200202**

<u>Name</u>	<u>Sex/Natl.</u>	<u>Position</u>	<u>Organization</u>
1. G. Hoff	M/USA	Field Party Chief	AFSC/S
2. S. Neidetcher	F/USA	Watch Leader	AFSC/S
3. C. Derrah	M/USA	Fish. Biologist	AFSC/S
4. K. Rand	F/USA	Fish. Biologist	AFSC/S

### **Cruise Schedule and Activities SE200201**

23 August	Board vessel @ 0900, Adak AK
24	Transit to Seguam Pass @ 0100
24-27	Recovery tows, Seguam Pass
27	Last tow @ 2030
28	Arrive Adak @ 1130, disembark

### **Cruise Schedule and Activities SE200202**

30 September	Board vessel @ 2000, Adak AK
1 October	Transit to Seguam Pass @ 0100
1-3	Recovery tows, Seguam Pass
3-4	Transit to Tanaga Pass
4-8	Recovery tows, Tanaga Pass
8-9	Offload fish, Adak AK
9	Transit to Tanaga Pass
9-10	Recovery tows, Tanaga Pass
10-12	Transit to Dutch Harbor, AK
12	Arrive Dutch Harbor, disembark

### **Summary of Results**

#### **Atka mackerel caught**

##### *Atka mackerel catch by area*

During the years 1999-2002 NMFS has released roughly 32,000 tags in Seguam Pass and 14,520 in Tanaga Pass in each of the strata shown in Figures 1 and 2. It is important that recovery effort during the charters be allocated to each strata where tags were released. Tables 1 and 2 show the distribution of tows among the strata in both Seguam and Tanaga Passes. A total of 19 tows were conducted in the Seguam Pass area before the fishery (SE200201), and 15 were conducted after the fishery (SE 200202). A total of 35 tows were conducted in the Tanaga Pass area after the fishery (SE200202). Tables 3 and 4 show the distribution of Atka mackerel catch by strata in both study areas. A total of 425 mt was caught in the Seguam Pass area before the fishery,

and 379 mt were caught after the fishery. A total of 482 mt was caught in the Tanaga Pass area after the fishery.

#### *Length-frequency distribution*

Lengths of 150 fish per tow were measured during both recovery cruises, Table 5 shows the total number of fish lengthed. Similar to what we observed during 2001, the length-frequency distribution of fish at Seguam Pass was bimodal, the modes were are ~ 36 cm and ~ 45 cm. This length-distribution is similar to that of the fish tagged in June, except that there were more small fish observed during the recovery cruise. This change in length-frequency distribution suggests a seasonal movement, perhaps related to spawning. There has also been an interannual change in size distribution. The length-frequency distribution of Seguam fish caught during both tagging and recovery cruises in 2000 was uni-modal with a mean ~ 45 cm. The bimodal shape of the length-frequency distributions in 2001 and 2002 suggests an influx of younger fish perhaps due to strong recruitment. In contrast to fish caught at Seguam Pass, the length-frequency distribution of fish at Tanaga Pass was unimodal with a mean ~ 42 cm.

#### *Other species caught*

Although most of the catches were very clean, other species besides Atka mackerel were caught (Tables 6, 7 and 8). The most abundant were walleye pollock, Pacific cod, Pacific ocean perch, northern rockfish and light dusky rockfish.

#### **Wild tag recoveries**

22 “wild tagged” Atka mackerel were caught during SE200201, and 42 were caught during SE200202. “Wild tagged” fish are fish that have been tagged during a tag release cruise (as opposed to seeded into the catch).

#### **Tag recovery rate**

Recovery rate is defined as the proportion of tagged fish caught by the vessel in a single haul that are actually found and reported. To determine this, the scientific personnel in the factory tagged 20 Atka mackerel from virtually all hauls and distributed them randomly through the catch. Because two different colors of tags have been used over the course of three years of tagging (pink and red), 10 fish were tagged with each color. These “seeded” tagged fish were recovered in the factory by the vessel and scientific crew. Table 9 shows the recovery rates during all the cruises. Recovery rates were very good, ranging from 87% to 100%, depending on cruise and area.

#### **Biological samples**

Table 10 summarizes the biological samples taken from Atka mackerel during the recovery cruises. Gonads, stomachs and otoliths were collected from 10 fish for every tow, 5 females and 5 males.

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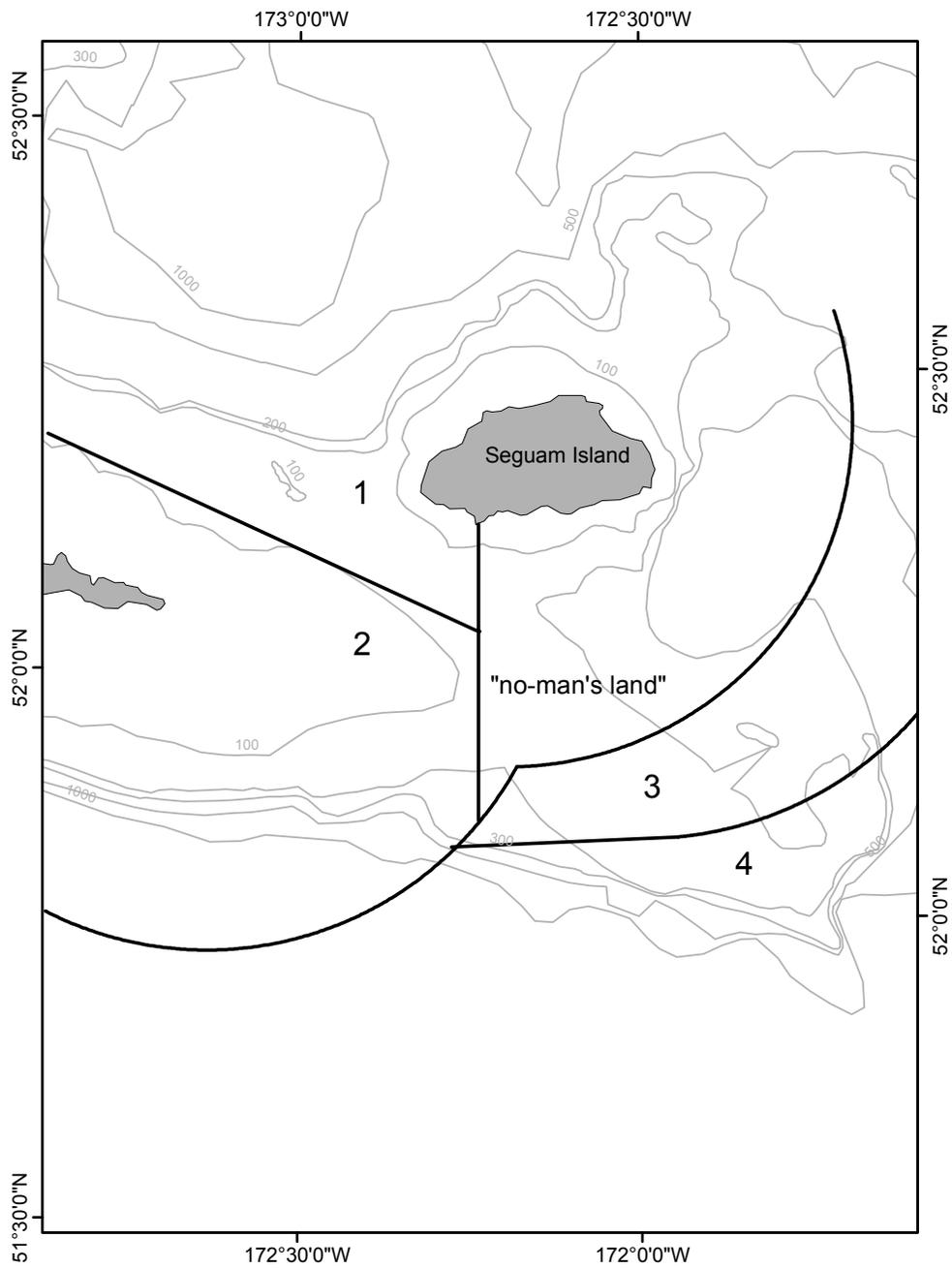


Figure 1. Strata locations for recapture of tagged Atka mackerel in Seguam Pass. Stratum 1 is preferred Atka mackerel habitat inside the trawl exclusion zone, stratum 2 is unpreferred habitat inside the trawl exclusion zone, stratum 3 is outside the trawl exclusion zone but inside critical habitat, stratum 4 is outside critical habitat.

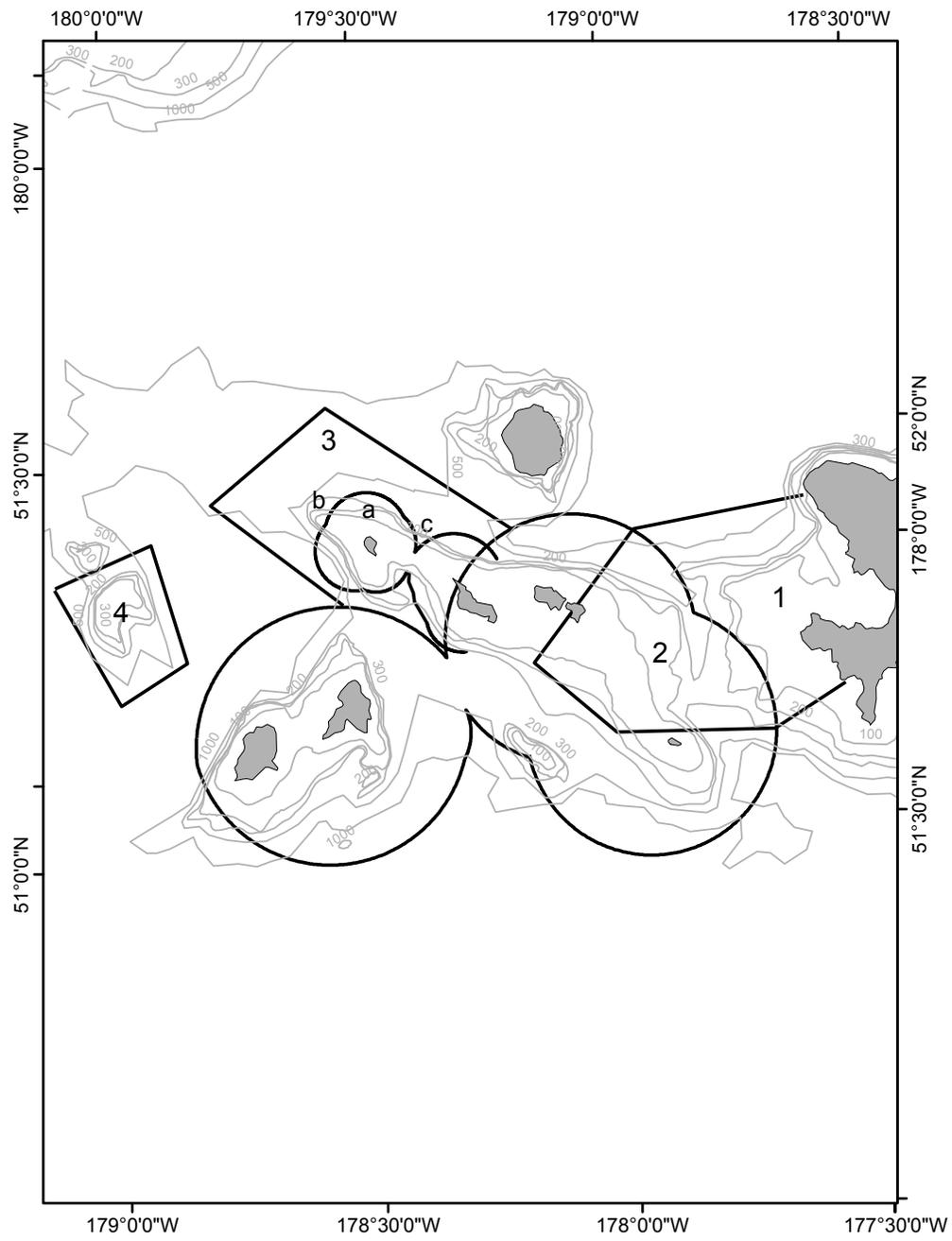


Figure 2. Strata locations in Tanaga pass. Strat 1, 3b, 3c and 4 are outside trawl exclusion zones, strata 2 and 3a are inside trawl exclusion zones

Table 1. Tows per strata before and after the fishery in Seguam Pass

Strata	1	2	3	4
Before Fishery	5	6	4	4
After Fishery	3	4	4	4

Table 2. Tows per strata after the fishery in Tanaga Pass

Strata	1	2	3a	3b	3c	4
After Fishery	6	7	9	4	5	4

Table 3. Atka Mackerel catch per strata before and after the fishery in Seguam Pass

Strata	1	2	3	4
Before Fishery in MT	127	98	103	97
After Fishery in MT	143	65	88	83

Table 4. Atka Mackerel catch per strata after the fishery in Tanaga Pass

Strata	1	2	3a	3b	3c	4
After Fishery in MT	83	135	117	46	63	39

Table 5. Total number of biological samples taken per cruise

Samples Collected	Before Fishery Seguam	After Fishery Seguam	After Fishery Tanaga
Gonads	185	150	305
Stomachs	185	150	305
Otoliths	185	150	305
Lengths	2950	2659	5081

Table 6. Total catch by species during the before-fishery cruise in Seguam Pass (in MT)

Species Name	Weight (MT)
arrowtooth flounder	0.271
Atka mackerel	425.416
chinook salmon	0.028
dusky rockfish unident.	0.343
Greenland turbot	0.136
harlequin rockfish	0.017
Kamchatka flounder	0.436
light dusky rockfish	2.648
northern rock sole	0.012
northern rockfish	8.223
Pacific cod	5.923
Pacific halibut	0.717
Pacific ocean perch	0.102
Pacific sleeper shark	0.080
rock sole sp.	0.680
rockfish unident.	0.408
rougheyeye rockfish	0.010
sablefish	0.231
skate unident.	1.710
walleye pollock	18.710
Other *	0.856

\*Other includes: Lumpsucker unident., sculpin unident., scaled crab, sponge unident., invertebrate unident., unsorted shab, poacher unident., searcher, irish lord, prowfish, brittlestarfish unident., starfish unident.

Table 7. Total catch by species during the after-fishery cruise in Seguam Pass (in MT)

Species Name	Weight (MT)
arrowtooth flounder	0.061
atka mackerel	379.125
brown king crab	0.011
chum salmon	0.029
dusky rockfish unident.	0.027
Greenland turbot	0.087
harlequin rockfish	0.003
Kamchatka flounder	0.281
light dusky rockfish	1.915
northern rock sole	0.05
northern rockfish	4.551
pacific cod	7.527
Pacific flatnose	0.461
pacific halibut	0.252
pacific ocean perch	2.325
rock sole sp.	0.208
sablefish	0.103
skate unident.	1.831
southern rock sole	0.003
squid unident.	0.028
walleye pollock	17.301
Other *	1.134

\* Other includes: brittlestarfish unident., basketstarfish unident., coral unident., spiny lump sucker, invertebrate unident., prowlfish, poacher unident., sea anemone unident., sea cucumber unident., searcher, sponge hermit crab, sponge unident., starfish unident., sculpin unident., scaled crab

Table 8. Total catch by species during the after-fishery cruise in Tanaga Pass (in MT)

Species Name	Weight (MT)
arrowtooth flounder	0.33
Atka mackerel	483.476
basketstarfish unident.	0.013
chinook salmon	0.01
chum salmon	0.047
dark dusky rockfish	0.029
dusky rockfish unident.	0.018
Greenland turbot	0.044
harlequin rockfish	0.256
Kamchatka flounder	1.23
light dusky rockfish	0.958
northern rockfish	43.858
octopus unident.	0.084
Pacific cod	58.339
Pacific halibut	1.126
Pacific ocean perch	18.419
rock sole sp.	0.655
roughey rockfish	0.289
sablefish	0.256
skate unident.	0.624
squid unident.	0.064
walleye pollock	0.536
Other *	4.684

\* Other includes: barnacle unident., basketstarfish unident., coral unident., crab unident., great sculpin, invertebrate unident., nudibranch unident., poacher unident., prowfish, ronquil unident., scallop unident., sculpin unident., sea anemone unident., sea cucumber unident., sea potato unident., sea urchin., searcher, snailfish unident., sponge unident., starfish unident., sturgeon poacher., tunicate unident.

Table 9. Tag recovery rate (after-fishery cruises in Seguam and Tanaga combined)

Tags	Before Fishery	After Fishery
Single Pink Tag	92.8%	97.9%
Single Red Tag	86.5%	91.6%
Double Pink Tag	N/A	100%
Single Red Tag	N/A	100%

Table 10. Total number of biological samples taken (by cruise and by area).

Samples Collected	Before Fishery Seguam	After Fishery Seguam	After Fishery Tanaga
Gonads	185	150	305
Stomachs	185	150	305
Otoliths	185	150	305
Lengths	2950	2659	5081